

REMARKS

Claims 1, 3, 4, 6, 10, and 12 are pending in this application. Applicants submit that the Examiner's rejections of the pending claims are unreasonable, and respectfully request again reconsideration of the claims.

Specifically, the Examiner asserted as follows (the paragraph bridging pages 22 and 23 of the present Office Action) (emphasis added):

Even though the references do not explicitly disclose the contact angle of water, the contact angle of water is an intrinsic property of the surface roughness as described in Applicant's own disclosure (see page 35 line 24 to page 36 line 8 and particularly Figure 8). That is, the contact angle of water of the transparent conductive oxide film is at least about 40° and not more than about 74° when the arithmetic mean deviation of the profile Ra (or the surface roughness) of the transparent conductive oxide film is at least about 0.5 nm and not more than 2 nm (see Figure 8 in Applicant's disclosure). Therefore, it is the position of the examiner that when the surface roughness of the transparent disclosure oxide film is at least 0.5 nm and not more 2 nm, as disclosed by Kloppel et al., Kawai and Huang, the surface of the transparent conductive film has a contact angle of water at least about 40° to not more than about 74°.

The Examiner explicitly admitted that the cited prior art does not teach, among other things, the contact angle of water, and explicitly relied on Applicants' disclosure. It is unclear as to what allows the Examiner to rely on Applicants' disclosure to cure the deficiencies of his cited prior art references. Applicants' disclosure is not prior art but describes Applicants' endeavor to solve issues they found and how to implement their invention. The Examiner is required to find his own prior art references to develop his own obviousness theory.

For the above reasons, the Examiner made a clear error in rejecting the claims under 35 U.S.C. § 103. Applicants present arguments which can be seen in the June 25, 2010 Amendment, and respectfully request the Examiner to appropriately reevaluate the cited prior art and reconsider claims 1, 3, 4, 6, 10, and 12

Claim Rejection under 35 U.S.C. § 103

1. Claims 1, 3, 4, 6 and 10 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over Sakata et al. (U.S. Patent Application Publication No. 2001/0008295, hereinafter “Sakata”) in view of Kloppel et al. (U.S. Patent Application Publication No. 2003/0170449, hereinafter “Kloppel”), Kataoka et al. (U.S. Patent No. 6,133,522, hereinafter “Kataoka”) and Yamazaki (U.S. Patent No. 4,746,962, hereinafter “Yamazaki”), and further in view of Minoru et al. (JP 2002-305212, hereinafter “Minoru”).

Sakata, Kloppel, Kataoka, Yamazaki, and Minoru, do not disclose or suggest a photovoltaic device including all the limitations recited in independent claim 1. Specifically, the applied combination of the references does not teach, among other things, that “said transparent conductive oxide film whose content of Sn is not more than 5 percent by weight has an arithmetic mean deviation of the profile (Ra) of at least about 0.5 nm and not more than 2 nm, and has a surface with respect to which a contact angle of water is at least about 40° and not more than about 74°,” recited in claim 1.

Claim 1 recites the limitations of cancelled claim 11. With respect to claim 11, the Examiner asserted that “[w]hile not explicitly disclosed [in Kloppel], ‘the contact angle of water on the surface of the ITO film is at least about 40° and not more than about 74°’ is an inherent property when the arithmetic mean deviation of the profile (Ra) of the ITO film is in the range of at least 0.5 nm to not more than about 2 nm (see Applicant’s specification, page 35 line 23 – Page 36 line 8 and Figure 8)” (the paragraph bridging pages 4 and 5 of the March 25, 2010 Office Action).

Applicants respectfully disagree. As claimed, the limitations “a surface with respect to which a contact angle of water is at least about 40° and not more than about 74°” can be obtained at least when (1) an Sn content of the transparent conductive oxide film is not more than 5 percent by weight and (2) the transparent conductive oxide film has an arithmetic mean deviation of the profile (Ra) of at least about 0.5 nm and not more than 2 nm.

According to the Examiner, Yamazaki teaches that “a content of SnO₂ (tin oxide) in a transparent conductive oxide electrode of a solar cell is about 1-10 wt% (See col. 6 lines 21-24, or col. 9 lines 33-34), or the Sn (e.g., tin) content is about 0.788-7.88 wt%” (the third full paragraph on page 4 of the March 25, 2010 Office Action). Kloppel teaches that “the transparent conductive oxide film of ITO having an arithmetic mean deviation of the profile (or surface roughness) of less than 1 nm (See paragraph [0013])” (the paragraph bridging pages 4 and 5 of the March 25, 2010 Office Action). Even if it is assumed for the sake of this response that the Examiner’s assertions for these references are proper, Yamazaki and Kloppel do not indicate a contact angle of water with respect to a surface of a transparent conductive oxide film in relation to the Sn content and the arithmetic mean deviation, respectively.

Applicants emphasize that merely identifying a part of limitations of the claim in disparate prior art references does not automatically establish that the remainder of the limitations is inherent.

The Examiner’s inherent arguments with respect to the claimed contact angle of water is improper, and does not cure the deficiencies of the applied combination of the references.

Based on the foregoing, Sakata, Kloppel, Kataoka, Yamazaki, and Minoru, do not disclose or suggest a photovoltaic device including all the limitations recited in independent claim 1. Dependent claims 3, 4, 6, and 10 are also patentably distinguishable over Sakata, Kloppel, Kataoka, Yamazaki, and Minoru at least because these claims respectively include all the limitations recited in independent claim 1. Applicants, therefore, respectfully solicit withdrawal of the rejection of the claims and favorable consideration thereof.

2. Claim 12 has been rejected under 35 U.S.C. § 103(a) as being unpatentable over Sakata in view of Kloppel, Kataoka, Yamazaki, and Minoru, and further in view of Morizane et al. (U.S. Patent Application Publication No. 2001/0045505, hereinafter “Morizane”).

Claim 12 depends on independent claim 1. Applicants thus incorporate herein the arguments made in response to the rejection of independent claim 1 under 35 U.S.C. § 103 for obviousness as predicated upon Sakata, Kloppel, Kataoka, Yamazaki, and Minoru. The Examiner’s additional comments and further reference to Morizane do not cure the deficiencies of the applied combination of Sakata, Kloppel, Kataoka, Yamazaki, and Minoru. Morizane does not address the above discussion regarding the claimed contact angle of water. Applicants, therefore, respectfully solicit withdrawal of the rejection of claim 12 and favorable consideration thereof.

3. Claims 1, 3, 4, 6 and 10 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over Sakata in view Kataoka, Yamazaki and Kawai et al. (JP 58-56479, hereinafter “Kawai”), and further in view of Minoru.

Sakata, Kataoka, Yamazaki, Kawai, and Minoru, do not disclose or suggest a photovoltaic device including all the limitations recited in independent claim 1. Specifically, the applied combination of the references does not teach, among other things, that “said transparent conductive oxide film whose content of Sn is not more than 5 percent by weight has an arithmetic mean deviation of the profile (Ra) of at least about 0.5 nm and not more than 2 nm, and has a surface with respect to which a contact angle of water is at least about 40° and not more than about 74°,” recited in claim 1.

Claim 1 now recites the limitations of cancelled claim 11. The Examiner took the same approach to reject claim 11 based on the combination of Sakata, Kloppel, Kataoka, Yamazaki, and Minoru (see paragraph 1 of this response). The Examiner asserted that “[w]hile not explicitly disclosed [in Kawai], ‘the contact angle of water on the surface of the ITO film is at

least about 40° and not more than about 74° is an inherent property of the material when the arithmetic mean deviation of the profile (Ra) of the ITO film is in the range of at least 0.5 nm to not more than about 2 nm (see Applicant's specification, page 35 line 23 – Page 36 line 8 and Figure 8)" (the second full paragraph on page 10 of the March 25, 2010 Office Action).

Applicants respectfully disagree, and again submit that the limitations "a surface with respect to which a contact angle of water is at least about 40° and not more than about 74°" can be obtained at least when (1) an Sn content of the transparent conductive oxide film is not more than 5 percent by weight and (2) the transparent conductive oxide film has an arithmetic mean deviation of the profile (Ra) of at least about 0.5 nm and not more than 2 nm.

According to the Examiner, Yamazaki teaches that "a content of SnO₂ (tin oxide) in a transparent conductive oxide electrode of a solar cell is about 1-10 wt% (See col. 6 lines 21-24, or col. 9 lines 33-34), or the Sn (e.g., tin) content is about 0.788-7.88 wt%" (the first full paragraph on page 10 of the March 25, 2010 Office Action). Kawai teaches that "the ITO can be polished to have a smooth surface roughness about 1nm (See English abstract, figures 7 and 8)" (the second full paragraph on page 10 of the March 25, 2010 Office Action). Even if it is assumed for the sake of this response that the Examiner's assertions for these references are proper, Yamazaki and Kawai do not indicate a contact angle of water with respect to a surface of a transparent conductive oxide film in relation to the Sn content and the arithmetic mean deviation, respectively.

Applicants emphasize that merely identifying a part of limitations of the claim in disparate prior art references does not automatically establish that the remainder of the limitations is inherent.

The Examiner's inherent arguments with respect to the claimed contact angle of water is improper, and does not cure the deficiencies of the applied combination of the references.

Based on the foregoing, Sakata, Kataoka, Yamazaki, Kawai, and Minoru, do not disclose or suggest a photovoltaic device including all the limitations recited in independent claim 1. Dependent claims 3, 4, 6, and 10 are also patentably distinguishable over Sakata, Kataoka, Yamazaki, Kawai, and Minoru at least because these claims respectively include all the limitations recited in independent claim 1. Applicants, therefore, respectfully solicit withdrawal of the rejection of the claims and favorable consideration thereof.

4. Claim 12 has been rejected under 35 U.S.C. § 103(a) as being unpatentable over Sakata in view of Kataoka, Yamazaki, Kawai, and Minoru, and further in view of Morizane.

Claim 12 depends on independent claim 1. Applicants thus incorporate herein the arguments made in response to the rejection of independent claim 1 under 35 U.S.C. § 103 for obviousness as predicated upon Sakata, Kataoka, Yamazaki, Kawai, and Minoru. The Examiner's additional comments and further reference to Morizane do not cure the deficiencies of the applied combination of Sakata, Kataoka, Yamazaki, Kawai, and Minoru. Morizane does not address the above discussion regarding the claimed contact angle of water. Applicants, therefore, respectfully solicit withdrawal of the rejection of claim 12 and favorable consideration thereof.

5. Claims 1, 3, 4, 6, and 10 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over Sakata in view Huang et al. (U.S. Patent Application Publication No. 2004/0087252, hereinafter "Huang"), Kataoka, and Yamazaki, and further in view of Minoru.

Sakata, Huang, Kataoka, Yamazaki, and Minoru, do not disclose or suggest a photovoltaic device including all the limitations recited in independent claim 1. Specifically, the

applied combination of the references does not teach, among other things, that “said transparent conductive oxide film whose content of Sn is not more than 5 percent by weight has an arithmetic mean deviation of the profile (Ra) of at least about 0.5 nm and not more than 2 nm, and has a surface with respect to which a contact angle of water is at least about 40° and not more than about 74°,” recited in claim 1.

Claim 1 now recites the limitations of cancelled claim 11. The Examiner took the same approach to reject claim 11 based on the combination of Sakata, Kloppel, Kataoka, Yamazaki, and Minoru (see paragraph 1 of this response). The Examiner asserted that “[w]hile not explicitly disclosed [in Huang], ‘the contact angle of water on the surface of the ITO film is at least about 40° and not more than about 74°’ is an inherent property of the material when the arithmetic mean deviation of the profile (Ra) of the ITO film is in the range of at least 0.5 nm to not more than about 2 nm (see Applicant’s specification, page 35 line 23 – Page 36 line 8 and Figure 8)” (the paragraph bridging pages 15 and 16 of the March 25, 2010 Office Action).

Applicants respectfully disagree, and again submit that the limitations “a surface with respect to which a contact angle of water is at least about 40° and not more than about 74°” can be obtained at least when (1) an Sn content of the transparent conductive oxide film is not more than 5 percent by weight and (2) the transparent conductive oxide film has an arithmetic mean deviation of the profile (Ra) of at least about 0.5 nm and not more than 2 nm.

According to the Examiner, Yamazaki teaches that “a content of SnO₂ (tin oxide) in a transparent conductive oxide electrode of a solar cell is about 1-10 wt% (See col. 6 lines 21-24, or col. 9 lines 33-34), or the Sn (e.g., tin) content is about 0.788-7.88 wt%” (the third full paragraph on page 15 of the March 25, 2010 Office Action). Huang teaches that “the transparent conductive oxide film of ITO can be polished to have a smooth surface with surface roughness of

less than 1.5 nm (See paragraph 0018), and particularly 0.87 nm (see paragraph 0021)" (the paragraph bridging pages 15 and 16 of the March 25, 2010 Office Action). Even if it is assumed for the sake of this response that the Examiner's assertions for these references are proper, Yamazaki and Huang do not indicate a contact angle of water with respect to a surface of a transparent conductive oxide film in relation to the Sn content and the arithmetic mean deviation, respectively.

Applicants emphasize that merely identifying a part of limitations of the claim in disparate prior art references does not automatically establish that the remainder of the limitations is inherent.

The Examiner's inherent arguments with respect to the claimed contact angle of water is improper, and does not cure the deficiencies of the applied combination of the references.

Based on the foregoing, Sakata, Huang, Kataoka, Yamazaki, and Minoru, do not disclose or suggest a photovoltaic device including all the limitations recited in independent claim 1. Dependent claims 3, 4, 6, and 10 are also patentably distinguishable over Sakata, Huang, Kataoka, Yamazaki, and Minoru at least because these claims respectively include all the limitations recited in independent claim 1. Applicants, therefore, respectfully solicit withdrawal of the rejection of the claims and favorable consideration thereof.

6. Claim 12 has been rejected under 35 U.S.C. § 103(a) as being unpatentable over Sakata in view of Huang, Kataoka, Yamazaki, and Minoru, and further in view of Morizane.

Claim 12 depends on independent claim 1. Applicants thus incorporate herein the arguments made in response to the rejection of independent claim 1 under 35 U.S.C. § 103 for obviousness as predicated upon Sakata, Huang, Kataoka, Yamazaki, and Minoru. The Examiner's additional comments and further reference to Morizane do not cure the deficiencies

of the applied combination of Sakata, Huang, Kataoka, Yamazaki, and Minoru. Morizane does not address the above discussion regarding the claimed contact angle of water. Applicants, therefore, respectfully solicit withdrawal of the rejection of claim 12 and favorable consideration thereof.

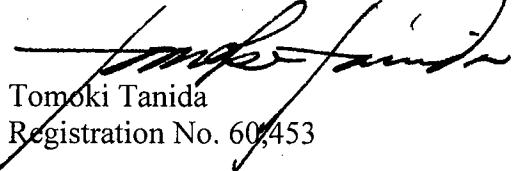
Conclusion

In view of the above amendments and remarks, Applicants submit that this application should be allowed and the case passed to issue. If there are any questions regarding this Amendment or the application in general, a telephone call to the undersigned would be appreciated to expedite the prosecution of the application.

To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account 500417 and please credit any excess fees to such deposit account.

Respectfully submitted,

McDERMOTT WILL & EMERY LLP


Tomoki Tanida
Registration No. 60,453

**Please recognize our Customer No. 20277
as our correspondence address.**

600 13th Street, N.W.
Washington, DC 20005-3096
Phone: 202.756.8000 TT:amz
Facsimile: 202.756.8087
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